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BEFORE THE ARIZONA CORPORATION COMMISSION

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COMMISSIONERS

GARY PIERCE - CHAIRMAN
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IN THE MATTER OF THE APPLICATION OF)
TUCSON ELECTRIC POWER COMPANY FOR)
APPROVAL OF ITS 2011 RENEWABLE)
ENERGY STANDARD AND TARIFF)
IMPLEMENTATION PLAN)

DOCKET NO. E-01933A-10-0266

**NOTICE OF COMPLIANCE
FILING**

Pursuant to Arizona Corporation Commission ("Commission") Decision No. 72033 (December 10, 2010), Tucson Electric Power Company ("TEP") was ordered to "...conduct or procure the studies outlined in this Order, in conjunction with a stakeholder process, and file them with the Commission no later than September 1, 2011." The studies outlined in Decision No. 72033 and TEP's responses are as follows:

I. Water-energy nexus: *The Commission would like the utilities to jointly procure or conduct a study of the water-energy nexus in Arizona, including an analysis of the amount of water that is and will be needed to supply Arizona consumers with energy, as well as a quantification of the amount of energy that is and will be needed to produce and supply water to Arizonans. The study should include an evaluation of the technical feasibility, operational consequences, water use impacts and electric cost impacts of dry and hybridized dry cooling. We would like the utilities to reach out to the Salt River Project ("SRP") to request their involvement in this study. (Decision No. 72033, page 16, line 25 to page 17, lines 2)*

TEP is participating (along with Arizona Public Service Company ("APS") and SRP) in a project led by the Sandia National Laboratory titled, "Energy and Water in the Western and Texas Interconnects". Please see the attached Exhibit 1 for a Project Summary. Other supporting partners participating in this study include Argonne National Laboratory, Electric Power Research

1 Institute, Idaho National Laboratory, National Renewable Energy Laboratory, Pacific Northwest
2 National Laboratory, and the University of Texas. This project is expected to be completed in
3 three phases over a period of 24 months. The first phase, which is related to total current and
4 future water usage, should be completed within the next 12 months. TEP will file a copy of the
5 results with the Commission once the study is complete.


6
7 **II. Increasing the Renewable Energy Standard:** *The Commission believes that the RES has*
8 *become a successful vehicle for diversifying regulated utilities' energy portfolios and thereby*
9 *ensuring more stable rates, and protecting the utilities and their customers from costly*
10 *environmental upgrades that will increasingly be needed for fossil-fuel generating units.*
11 *Additionally, renewable energy is a means of supplying power that does not rely on the*
12 *procurement of fuel from faraway locales, providing additional benefits to ratepayers in the form*
13 *of greater state and national security. And the Commission is also aware that numerous Arizona*
14 *landowners and entities are interested in developing renewable energy and selling it to an Arizona*
15 *utility, but that this has become increasingly difficult, as the Arizona utilities will largely have met*
16 *their RES obligations through PPAs or projects that have already been signed or approved.*
17 *Therefore, we are interested in better understanding the costs and benefits associated with*
18 *increasing the RES, and would like the utilities to jointly procure an independent study on this*
19 *topic to be used in a future stakeholder process at the Commission. This study should include an*
20 *analysis of how renewable energy from an expanded RES could help to backfill power related to*
21 *the potential future decommissioning of any coal plants in Arizona, including the Four Corners*
22 *Power Plant Units 1 through 3. (Decision No. 72033, page 17, lines 3-11)*

23 TEP has included an increased renewable energy standard scenario in its Integrated
24 Resource Plan ("IRP"), which was originally set to be filed on April 19, 2011, but was waived by
25 the Commission until April 1, 2012. Integrating the required study for increasing the renewable
26 study into the TEP's IRP is consistent with Commission Decision No. 72022 (December 10, 2010)

1 for APS, which allowed it to address the issue when it files its IRP with the Commission in April
2 2012.

3
4 RESPECTFULLY SUBMITTED this 1st day of September, 2011.

5
6 TUCSON ELECTRIC POWER COMPANY

7
8 By 
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19 Original and 13 copies of the foregoing
20 filed this 1st day of September, 2011 with:

21 Docket Control
22 Arizona Corporation Commission
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Phoenix, Arizona 85007

23 Copies of the foregoing hand-delivered/mailed
24 this 1st day of September 2011 to the following:

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12 By Debbie Amasal
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EXHIBIT

“1”

Project Summary

Project Title: Energy and Water in the Western and Texas Interconnects

Lead Laboratory: Sandia National Laboratories

Principal Investigator: Dr. Vincent Tidwell (email: vctidwe@sandia.gov)

Supporting Partners: Argonne National Laboratory
Electric Power Research Institute
Idaho National Laboratory
National Renewable Energy Laboratory
Pacific Northwest National Laboratory
University of Texas

Project Objectives: This proposal is in response to the Research Call to DOE/Federal Laboratories for “Technical Support for Interconnection-Level Electric Infrastructure Planning, RC-BM-2010” Area of Interest 3: Water/Energy Nexus. According to the stated needs of the Research Call, three overarching objects are identified:

1. Develop an integrated Energy-Water Decision Support System (DSS) that will enable planners in the Western and Texas Interconnections to analyze the potential implications of water stress for transmission and resource planning.
2. Pursue the formulation and development of the Energy-Water DSS through a strongly collaborative process between members of this proposal team and the Western Electricity Coordinating Council (WECC), Western Governors’ Association (WGA), the Electric Reliability Council of Texas (ERCOT) and their associated stakeholder teams.
3. Exercise the Energy-Water DSS to investigate water stress implications of the transmission planning scenarios put forward by WECC, WGA, and ERCOT.

Project Methods: Beyond efforts toward project management and reporting, eight additional project tasks are focused on the development of the Energy-Water DSS. The initial foundation for this tool is Sandia National Laboratories (Sandia) Energy-Power-Water Simulation (EPWSim) model. This existing framework provides an interactive environment for exploring trade-offs, and “best” alternatives among a broad list of energy/water options and objectives. The framework currently supports prototype modules for calculating thermoelectric power demand and related water use; water demand from competing use sectors; surface and groundwater availability, and; an energy for water calculator. Each of these modules will be updated and expanded, while additional process modules will be added.

Development of the DSS will be conducted in close cooperation with WECC, WGA, ERCOT and their stakeholder teams. To enhance transparency and consensus a Collaborative Modeling Team (CMT) will be assembled to oversee development of the Energy-Water DSS. Team membership will include a subgroup of our interconnection partners. The CMT will meet on a periodic basis with our project modelers to define: 1) key metrics and decision variable for inclusion in the DSS; 2) vet process models; 3) vet data, water use factors, etc; 4) jointly review the models and conduct calibration analyses; and 5) conduct desired scenario analyses.

The first module of the DSS calculates water withdrawals and consumption for current and projected thermoelectric power generation. Input to the model are WECC and ERCOT’s transmission planning results. Water demands are calculated according to power plant capacity, production, type of plant, type of cooling, and type of emissions control. Accompanying parasitic energy loads imposed by emission

controls and water-conserving cooling technologies are also calculated. Using information on population growth, Gross State Product and historical water use trends, future water demands are calculated for competing water use sectors (municipal, industrial, agriculture, mining and livestock). The source of the withdrawal (surface water, groundwater, or non-potable water) is tracked as well as the return flows.

The DSS is also fitted with a water availability model that provides a regional measure of water supply for surface water, groundwater, and non-potable resources. The model has two principle components, "wet" and "paper" water. Wet water provides a measure of the physical water available in a basin for use, while paper water addresses the institutional controls (policies) that define access to the water. The model combines historical gauge data and other information to project surface and groundwater availability.

The water demand and availability modules are accompanied by additional process models to further resolve water availability. The first of these is an environmental controls model for identification and assessment of potential environmental risks associated with growing water use. A climate change calculator is included for estimating potential changes in water availability. This will include two components – a climate downscaling model to provide future climate forcing data for the watershed model and a dynamic large-scale watershed model to project related changes to water availability. Beyond the scarcity of water, information concerning the potential cost of water for a new withdrawal is calculated including water rights purchase, value of goods and their water intensity, and cost of treating non-potable water. Finally, an energy for water calculator is included to calculate electricity demand to pump, convey, treat (both primary and waste water), and distribute water.

The DSS is fitted with an interface that serves as the "dashboard" controlling scenario makeup, simulation operations, and the rendering of results. This dashboard provides an interactive, real-time environment comprised of slider bars, buttons and switches for changing key input variables, and real-time output graphs, tables, and geospatial maps for displaying results. The DSS operates on a laptop computer taking only few seconds to accomplish a simulation. The DSS can be distributed to users on CD or via download from the internet.

Project Benefits and Outcomes: A key deliverable from this project is an integrated Energy-Water DSS that will enable planners in the Western and Texas Interconnections to analyze the potential implications of water stress for transmission and resource planning. Working with WECC, WGA, and ERCOT and utilizing this Energy-Water DSS a wide range of transmission planning scenarios will be simulated and evaluated.

While timely accomplishment of these tasks is important and necessary, we are striving for broader impact. Currently there are no long-range, interconnection-wide transmission plans for the Western and Texas Interconnections. Consequently, the ability to assess how various infrastructure options balance reliability, cost, and the environment from an interconnection-wide perspective does not exist. This project coordinated with the efforts of WECC, WGA, ERCOT and their partners will create a comprehensive package of stakeholder-vetted, regional planning models, data, and conclusions that are coordinated at the interconnection-wide level. Cumulatively, this information will substantially improve the quality and quantity of information available to industry planners, state and federal policymakers and regulators. Specifically, this project will supplement interconnection-wide transmission planning studies with information on water availability, which is critical in shaping electricity generation options.

This proposed project represents the first comprehensive, regional analysis of the energy-water nexus. This is also the first coordinated analysis undertaken by federal and state agencies, the power industry, NGOs and other interested stakeholders. In this way, the data, models, scenario analyses, and insights derived from this effort will provide a significantly improved body of evidence for policy making at local, state and federal levels.